



ST. XAVIER'S COLLEGE – MUMBAI
(Est. 1869)

(An Autonomous College affiliated with the University of Mumbai)

**Syllabus for Four-Year Undergraduate
Programme as per National Education Policy
(NEP-2020)**

**Programme:
BA in STATISTICS**

The academic year 2025–2026



APPROVED SYLLABUS

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**PRINCIPAL
ST. XAVIER'S COLLEGE
(AUTONOMOUS)
MUMBAI - 400 001.**

Syllabus

Fifth Semester Courses in Statistics

2025-2026

Contents:

- Syllabus for Minor Courses:
 - UASTA5501MN1 : Multiple Linear Regression
- Evaluation and Assessment guidelines



APPROVED SYLLABUS

Third Year BA in Statistics		
Course Title: Multiple Linear Regression		Course Code:UASTA5501MN1
Credits: Theory (2) = 30 hr		
No.	Course Objectives The course aims to	
1	fit a Simple linear regression and Multiple linear regression (MLR) with two independent variables.	
2	understand and detect multicollinearity, heteroscedasticity and auto-correlation in a MLR and study the consequences of their presence in ordinary Least squares estimation.	
CO	Course Outcomes On completing the course, the learner will be able to	Bloom's Taxonomy Level (BT level)
1	define the terms involved in MLR.	Knowledge
2	build an appropriate model and use the technique of estimation and testing for MLR.	Understanding
3	solve problems based on the above topics.	Analysis

Unit 1 : SIMPLE & MULTIPLE LINEAR REGRESSION

(15 L)

Concept of Multiple Linear regression Model.

Assumptions of the classical linear regression model,

Simple linear regression model with one independent variable,

Multiple linear regression model with two independent variables:

Derivation of ordinary least square (OLS) estimators of regression coefficients.

Properties of least square estimators (without proof)

Coefficient of determination, R^2 and adjusted R^2 .

Procedure of testing

i) overall significance of the model

ii) significance of individual coefficients

iii) significance of contribution of additional independent variables to a two independent variable model.

Confidence intervals for the regression coefficients.



Unit 2: VALIDITY OF MULTIPLE LINEAR REGRESSION MODEL

(15 L)

ASSUMPTIONS :

Normality of errors, Autocorrelation: Concept, Detection using i) Durbin Watson Test, Consequences of using OLS estimators in presence of autocorrelation,

Heteroscedasticity: Concept, Detection using i) Breusch – Pagan – Godfrey test. Consequences of using OLS estimators in presence of heteroscedasticity.

Multicollinearity: Concept, Detection using R square & t ratios, simple correlation coefficients, Tolerance-Variance Inflation Factor (VIF)

Consequences of using OLS estimators in presence of multicollinearity.

List of Recommended Reference Books:

1. Damodar Gujarati: Basic Econometrics, Second edition McGraw-Hill Companies.
2. Chatterjee S. and Hadi A.S.: Regression Analysis by example, Fifth edition, Wiley India.
3. Montgomery D. C., Peck E. A. and Vining G. G.: Introduction to linear regression analysis, third edition, John Wiley and sons (Asia) pte ltd.

Evaluation (Theory, UASTA5501MN1): Total marks per course - 50.

- I. Formative Assessment for Learning -Theory
(continuous internal assessment - CIA to improve learning).
CIA: 20 marks
- II. Summative Assessment of Learning -Theory
(focus on outcomes, quantitative data for outcomes of instruction).
End Semester Examination: 30 marks

Distribution of Bloom’s Taxonomy levels for the course assessment:

Learning Levels	Knowledge	Understanding	Analysis
% Weightage	5-10%	50-60%	10-20%



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